

REMARKS

This responds to the Office Action mailed on May 1, 2007. Reconsideration is respectfully requested.

Claims 1 – 3, 10, 12 – 14, 20, 22 – 24, 26, 27 and 29 – 33 are amended. Claims 1 – 37 remain pending in this application.

Objections to the Claims

Claims 3, 14, and 31 were objected to due to informalities. Claims 3, 14 and 31 have been amended to correct the informalities noted by the Examiner. Applicants would like to thank the Examiner for noting these informalities.

Allowable Subject Matter

Claims 10, 20, and 24 were objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 10 has been rewritten in independent form to include the limitations of base claim 1 and intervening claim 2, and is believed to be in condition for allowance.

Claim 20 has been rewritten in independent form to include the limitations of base claim 12 and intervening claim 13, and is believed to be in condition for allowance.

Claim 24 has been rewritten in independent form to include the limitations of base claim 22 and intervening claim 23, and is believed to be in condition for allowance.

§101 Rejection of the Claims

Claims 29-31 were rejected under 35 U.S.C. § 101 because the claimed invention is not directed to non-statutory subject matter. Claims 29 – 31 have been amended to recite a computer-readable medium that stores instructions for execution by one or more processors. Accordingly, Applicants submit that claims 29 – 31 are directed to statutory subject matter and that the rejection under 35 U.S.C. § 101 has been overcome.

§ 102 Rejection of the Claims

Claims 1, 2, 5, 11, 22, 23, 25, 32-34, 36 and 37 were rejected under 35 U.S.C. § 102(b) as being anticipated by Supplement to IEEE Standard for IT-Telecommunications & Information Exchange Between Systems – Local and Metropolitan Area Networks – Specific Requirements. Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications: High-Speed Physical Layer in 5 GHz Band, IEEE Standard 802.11a, December 20, 1999 IEEE Standard.

Applicants' claim 1 as amended recites that communicating over a high-throughput communication channel may include communicating over a wideband channel when indicated by the channelization field. As recited in claim 1, the channelization field is transmitted as part of a current data unit indicating a frequency and space configuration of subsequent portions of the current data unit. As further recited in claim 1, the channelization field indicates whether the high-throughput communication channel is a wideband channel and that two or more valid operating channels comprise the wideband channel. Accordingly, the high-throughput training field is transmitted in accordance with the indicated channelization field so that the receiving station will estimate the channel matrix using the two or more valid operating channels that comprise the wideband channel when indicated as such.

In the "Supplement to IEEE 802.11(a)" referenced above, higher-throughput is achieved in the 5 GHz band through the use of combinations of modulations and coding rates to increase the number of coded bits per OFDM symbol (see table 78). This is accomplished at a *single* one of several valid operating channels defined in the 5 GHz frequency band. The "Supplement to IEEE 802.11(a)" discloses that *only a single operating channel be used at a time* and requires that adjacent and alternate channels be rejected by the receiver (see table 91 page 31 of the "Supplement to IEEE 802.11(a)" and section 17.3.10). Thus, there can be no concurrent use of two or more operating channels. Furthermore, for a transmitter to be compliant with the "Supplement to IEEE 802.11(a)", it can only transmit within a single operating channel which limiting the occupied bandwidth to 16.6 MHz (see "Supplement to IEEE 802.11(a)" table 86 page 24). Furthermore, the "Supplement to IEEE 802.11(a)" limits the transmit spectrum to a single operating channel (see figure 120 on page 29 and section 17.3.9 of the "Supplement to

IEEE 802.11(a)"). Because of the restriction in the "Supplement to IEEE 802.11(a)" to single-channel operation, bandwidth and throughput is limited to the bandwidth/throughput of an individual valid operating channel.

Applicants' claim 1, on the other hand, provides for the possibility of even higher throughput by providing for a wideband channel that concurrently uses two or more valid operating channels. The channelization field indicates to the receiver which of the several valid operating channels are to be used as a wideband channel to receive subsequent portion of the packet. In the "Supplement to IEEE 802.11(a)", the PLCP header (illustrated in FIG. 122 page 33) does not include such a channelization field. The PLCP header only includes a rate field of 4-bits to indicate the rate that the data portion of the packet is transmitted indicating that IEEE 802.11(a) is restricted to single-channel use.

Accordingly, Applicants submit that claim 1 is not anticipated by the "Supplement to IEEE 802.11(a)" and is believed to be allowable. Other independent claims 22 and 32 have similar recitations and are also believed to be allowable. Claims 2, 5, and 11 are also believed to be allowable at least because of their dependency on claim 1 and as further discussed below. Claims 23 and 25 are also believed to be allowable at least because of their dependency on claim 22 and as further discussed below. Claims 33, 34, 36, and 37 are also believed to be allowable at least because of their dependency on claim 32 and as further discussed below.

Claim 2, as amended, recites that the channelization field may indicate that the high-throughput channel can alternatively be a MIMO channel or a MIMO wideband channel. The MIMO channel is defined as a single subchannel (single valid operating channel) that has between two and four spatial subchannels with up to four distinct data streams transmitted thereon. The wideband-MIMO channel is defined to have two or more frequency separated subchannels used concurrently wherein each subchannel has two or more spatial channels. As further recited in claim 2, the spatial channels comprise non-frequency-orthogonal channels associated with a signal subchannel in which orthogonality between the spatial channels is achieved by antenna diversity. Claims 23 and 33 have similar recitations.

Applicants' find no support in the "Supplement to IEEE 802.11(a)" for the use of non-frequency orthogonal spatial channels achieved through antenna diversity. Applicants' find no

support in the “Supplement to IEEE 802.11(a)” for the concurrent use of more than one valid operating channel wherein each valid operating channel has two or more spatial channels. The “Supplement to IEEE 802.11(a)” shows only a single antenna at both the receiver and transmitter and a single RF receive or transmit signal path (see FIG. 118 page 24). Furthermore, the number of subcarriers is limited to 52 with an occupied bandwidth of 16.6 MHz (see table 86 page 24) which limits the devices that operate in accordance with the “Supplement to IEEE 802.11(a)” to operation on a signal valid operating channel. Applicants furthermore find no teaching, suggestion, or motivation in section 17.3.8.3.3. or table 88 of the “Supplement to IEEE 802.11(a)”, as stated by the Examiner, to allow more than one spatial channel. Accordingly, claims 2, 23, and 33 are believed to be allowable over the “Supplement to IEEE 802.11(a)”.

Applicants’ claim 11 recites that PLCP header field comprises a mask to indicate fields of the PLCP header field, the fields including at least some of: a bit-loading per subchannel, a coding rate, a length, a transmit power level, an available transmit power level, a frequency channelization request, a number of spatial channels request, a bit loading subchannel request, a power loading per subchannel request, a coding rate request, a transmit power request, and a duration recommendation. Since the “Supplement to IEEE 802.11(a)” does not allow the use of more than one valid operating channel or the use of spatial channels, the parameters of the PLCP (shown in the “Supplement to IEEE 802.11(a)”) do not include fields for a number of spatial channels request, a bit loading subchannel request, a power loading per subchannel request, since only one subchannel is possible. The parameters in Section 17.3 of the “Supplement to IEEE 802.11(a)” for PLCP header of FIG. 107 are limited to a single valid operation channel (see table 79 page 9). Accordingly, claim 11 cannot be anticipated by the “Supplement to IEEE 802.11(a)”.

Claims 12 and 26 were rejected under 35 U.S.C. § 102(e) as being anticipated by Fitton et al. (U.S. 2004/0085917). Applicants’ claim 12 is directed to a transmitter that includes RF circuitry to transmit a channelization field on a compatibility subchannel in which the channelization field is modulated with a rotated binary phase shift keying (BPSK) modulation. Claim 12 also recites that the channelization field is part of a current data unit and indicates a frequency and space configuration of subsequent portions of the current data unit. Claim 12 also

recites that the channelization field indicates whether a high-throughput communication channel used for transmitting the subsequent portions of the current data unit is a wideband channel and that the wideband channel comprising a concurrent use of two or more valid operating channels. Claim 12 also recites that the channelization field indicates that the high-throughput communication channel is a wideband channel, the channelization field indicates which of the two or more valid operating channels comprise the wideband channel. Claim 26 has similar recitations.

Although Fitton discloses rotating DBPSK modulation for the transmission of various portions of a packet (see Fitton paragraph 0046), Fitton does not teach the transmission using rotated BPSK modulation of a channelization field that indicates whether a wideband channel (as defined in the claim) is used for transmitting subsequent portions of the data packet. Fitton discloses only single-channel operations. In Fitton, the header fields (see table 1 after paragraph [0049]) do not include any indication that more than one channel can be used. Fitton achieves higher data rates or throughput through the use of a training sequence and channel estimates. Applicants' claim 12, achieves higher throughput by the concurrent use of two or more valid operating channels.

Accordingly, Applicants submit that claims 12 and 26 are not anticipated by Fitton.

§103 Rejection of the Claims

Claims 3 and 4 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Supplement to IEEE Standard for IT-Telecommunications & Information Exchange Between Systems – Local and Metropolitan Area Networks – Specific Requirements. Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications: High-Speed Physical Layer in 5 GHz Band, IEEE Standard 802.11a, December 20, 1999 IEEE Standard in view of Tarokh et al. (U.S. 2004/0235529).

Tarokh provides a solution to the hidden beam problem associated with directional antennas. In Tarokh, a small portion of the power is directed to unintended users which sense the transmission so that the unintended users will remain silent. This allows the intended users to

receive a transmission with a lower probability of packet collisions (see Tarokh paragraph [0093]).

Applicants' claim 3, on the other hand, recites the formation of spatial channels by beamforming and antenna diversity. As read together with claim 2 from which claim 3 depends from, the spatial channels may be used to concurrently transmit separate data streams, or concurrently transmit the same data stream (e.g., for redundancy). This is not the case in Tarokh in which one data stream is transmitted to the intended listener and simply intercepted by an unintended listener. This interpretation is consistent with paragraph [0117] of Tarokh cited by the Examiner.

The transmission of different data on the different spatial channels is further emphasized in claim 4 by reciting that each spatial channel carries different data portions of an OFDM symbol. There are no such teachings in Tarokh.

In view of the above, Applicants submit that combination of the "Supplement to IEEE 802.11(a)" with Tarokh does not result in Applicants invention as recited in claims 3 and 4 and that the rejection of claims 3 and 4 has been overcome.

Claims 6-9 and 25 were also rejected under 35 U.S.C. § 103(a) as being unpatentable over the "Supplement to IEEE 802.11(a)" in view of Fitton et al.

Claims 6-9 and 25 are believed to be allowable

As discussed above regarding claim 1, the "Supplement to IEEE 802.11(a)" does not to teach, suggest, or motivate the recitations of Applicants' claims 1 and 22. Claims 6 – 9 recite, in addition, the use of rotated BPSK modulation. As discussed above regarding claim 12, Fitton does not teach the transmission using rotated BPSK modulation of a channelization field that indicates whether a wideband channel (as defined in the claim) is used for transmitting subsequent portions of the data packet. In view of this, Applicants submit that the combination of the "Supplement to IEEE 802.11(a)" with Fitton does not resulting Applicants' claimed invention as recited in claims 6 – 9 and 25.

Claims 13, 16-19, 21, 27 and 28 were also rejected under 35 U.S.C. § 103(a) as being unpatentable over Fitton et al. in view of the "Supplement to IEEE 802.11(a)". Claims 14 and 15

were also rejected under 35 U.S.C. § 103(a) as being unpatentable over Fitton et al. in view of the “Supplement to IEEE 802.11(a)” and further in view of Tarokh et al.

Claims 13 - 19, 21, 27, and 28 are believed to be allowable. As discussed above, the combination of the “Supplement to IEEE 802.11(a)” and Fitton do not result in Applicants’ claimed invention as recited in independent claims 12 and 26. The dependent claims of claims 12 and 26 are believed to be allowable at least because of their dependency.

Claims 29 and 30 were also rejected under 35 U.S.C. § 103(a) as being unpatentable over the “Supplement to IEEE 802.11(a)” in view of Knobel et al. (U.S. 2004/0032354). Claim 31 was also rejected under 35 U.S.C. § 103(a) as being unpatentable over the “Supplement to IEEE 802.11(a)” in view of Fitton et al. and further in view of Knobel et al.

Knobel has been cited by the Examiner for disclosing that transmitter functions can be done in software. Applicants’ submit that the combination of the “Supplement to IEEE 802.11(a)”, Fitton and Knobel does not result in Applicants’ claimed invention as recited claims 29 – 31 at least for the reasons discussed above with respect to claims 1 and 12.

RESERVATION OF RIGHTS

In the interest of clarity and brevity, Applicant may not have addressed every assertion made in the Office Action. Applicants’ silence regarding any such assertion does not constitute any admission or acquiescence. Applicant reserves all rights not exercised in connection with this response, such as the right to challenge or rebut any tacit or explicit characterization of any reference or of any of the present claims, the right to challenge or rebut any asserted factual or legal basis of any of the rejections, the right to swear behind any cited reference such as provided under 37 C.F.R. § 1.131 or otherwise, or the right to assert co-ownership of any cited reference. Applicant does not admit that any of the cited references or any other references of record are relevant to the present claims, or that they constitute prior art. To the extent that any rejection or assertion is based upon the Examiner’s personal knowledge, rather than any objective evidence of record as manifested by a cited prior art reference, Applicant timely objects to such reliance on Official Notice, and reserves all rights to request that the Examiner provide a reference or affidavit in support of such assertion, as required by MPEP § 2144.03. Applicant reserves all

rights to pursue any cancelled claims in a subsequent patent application claiming the benefit of priority of the present patent application, and to request rejoinder of any withdrawn claim, as required by MPEP § 821.04.

CONCLUSION

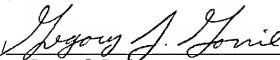
Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicants' attorney ((480) 659-3314) to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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